



(11) **EP 4 375 700 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**11.09.2024 Bulletin 2024/37**

(51) International Patent Classification (IPC):  
**G01S 7/48** (2006.01) **G01S 17/42** (2006.01)  
**G01S 17/931** (2020.01) **G06N 20/00** (2019.01)

(43) Date of publication A2:  
**29.05.2024 Bulletin 2024/22**

(52) Cooperative Patent Classification (CPC):  
**G01S 17/931; G01S 7/4802; G01S 7/4808;**  
**G01S 17/42; G06N 20/00**

(21) Application number: **23211330.8**

(22) Date of filing: **21.11.2023**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB**  
**GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL**  
**NO PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA**  
Designated Validation States:  
**KH MA MD TN**

(72) Inventors:  
• **RANGANATH, Deepak**  
**San Jose, 95138 (US)**  
• **JAIN, Vishal**  
**San Jose, 95138 (US)**

(74) Representative: **FRKelly**  
**Waterways House**  
**Grand Canal Quay**  
**Dublin D02 PD39 (IE)**

(30) Priority: **28.11.2022 US 202218070213**

(71) Applicant: **Velodyne Lidar USA, Inc.**  
**San Jose, CA 95138 (US)**

(54) **LIDAR SCENE GENERATION FOR TRAINING MACHINE LEARNING MODELS**

(57) A lidar method and system for training and using a machine learning model are disclosed. An example method includes: obtaining a map of a background scene, the map including three-dimensional (3D) point cloud data; obtaining at least one point cloud representation of at least one foreground object, the at least one point cloud representation including 3D point cloud data, wherein one or more lidar sensors were used to generate the 3D point cloud data for the map and the at least one point cloud representation; generating a lidar scene by placing the at least one point cloud representation within the map; and training the machine learning model using the generated lidar scene. The model can be used to identify objects and control a vehicle.

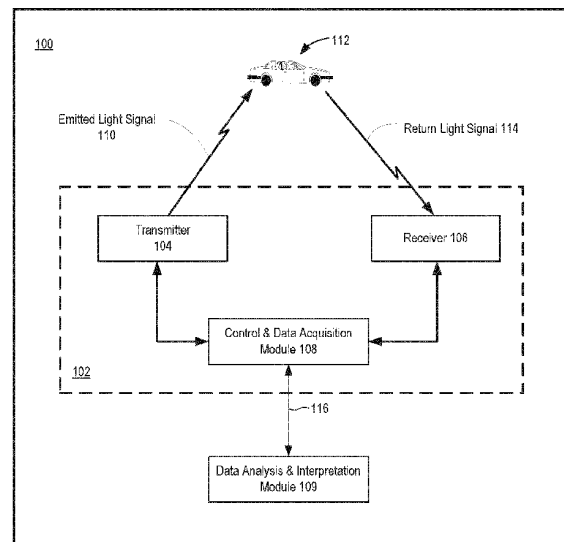


FIG. 1



## EUROPEAN SEARCH REPORT

Application Number

EP 23 21 1330

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2020/202208 A1 (LI DALONG [US] ET AL) 25 June 2020 (2020-06-25)	1,2,4-6, 9-12	INV. G01S7/48
Y	* paragraphs [0020], [0028] - [0035]; figures 1-3 *	7,8	G01S17/42 G01S17/931 G06N20/00
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X	US 2020/074230 A1 (ENGLARD BENJAMIN [US] ET AL) 5 March 2020 (2020-03-05)	1-6,9-12	
Y	* paragraphs [0062] - [0063], [0068] - [0073], [0078] - [0085], [0091]; figures 1-4 *	7,8	
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Y	US 2021/316669 A1 (WANG YONGJUN [US]) 14 October 2021 (2021-10-14)	7,8	
	* paragraphs [0118] - [0140]; figures 6-8 *		
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			TECHNICAL FIELDS SEARCHED (IPC)
			G01S G06N
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>1 August 2024</b>	Examiner <b>TheiBing, Nikolaus</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	



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EP 23 21 1330

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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number

EP 23 21 1330

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-6, 9-12

How to obtain the map of a background scene in an alternative way.

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2. claims: 7, 8

How to obtain the at least one point cloud representation of at least one foreground object in an alternative way.

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ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 23 21 1330

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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01-08-2024

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82